REMARKS

Summary of the Office Action

Claims 1, 2, 5, 7, 9 and 10 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Summary of the Response to the Office Action

Applicant has canceled claims 2-5 and 8-12 without prejudice or disclaimer. Applicant has also amended claims 1, 6 and 7 to differently describe embodiments of the disclosure of the instant application's specification and/or to improve the form of the claims. Accordingly, claims 1, 6 and 7 remain pending for consideration.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 1, 2, 5, 7, 9 and 10 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant has amended claims 1, 6 and 7 in response to the Examiner's comments at pages 3-5 of the Office Action. More particularly, Applicant has amended claims 1 and 6 to replace the term "high-molecular compound" with --polymer compound--. Applicant respectfully submits that the term "high-molecular compound" implies a synthetic chemical compound of usually high molecular weight consisting of up to millions of repeated linked units, each a relatively light and simple molecule, that is a polymer compound. In the amended claim 1, Applicant respectfully submits that the "polymer compound film" is made of a paraxylylene polymerized or a chlorinated paraxylylene polymerized. This is supported, for example, by lines 10-13 on page 10 of the instant application's specification.

Also, Applicant has newly-amended claims 1 and 7 to describe that the inorganic barrier film is made of an inorganic compound. Applicant respectfully submits that "inorganic compounds" means generally compounds not containing hydrocarbon groups. In the amended claim 1, Applicant respectfully submits that the inorganic barrier film is made of silicon nitride or silicon oxynitride or silicon oxide.

Further, Applicant has amended the present claims so that claim 1 includes features previously appearing in claims 2, 5 and 9 and illustrated in Figs. 1, 4, 5 and 6. For example, first of all, Applicant respectfully submits that the edge of the polymer compound film is so formed that the edge becomes gradually thinner so as to ensure the formation of a smooth inorganic surface of the inorganic barrier film. See, for example, page 7 lines 20 to 22 of the present application. As seen from Figs. 1, 4 and 6, the inorganic barrier film 16S covers the polymer compound film 16P and its edge E and a further surrounding surface R2 of the substrate 10 encircling the polymer compound film. Applicant respectfully submits that the edge E of the polymer compound film 16P is so formed that it becomes gradually thinner so as to ensure the formation of a smooth inorganic surface of the inorganic barrier film 16S.

Secondly the feature "the first and second display electrodes have ends uncovered with said inorganic barrier film" in the amended claim 1 is supported, for example, by Figs. 1, 4, 5 and 6 of the present application. The ends of the first display electrode 13 (i.e., anode of a transparent electrode) and the second display electrode 15 (i.e., cathode of a metallic electrode) are uncovered with the inorganic barrier film 16S as shown in Figs. 1, 4, 5 and 6, for example.

Thus, for at least the foregoing reasons, Applicant respectfully submits that claims 1, 6 and 7, as amended, fully comply with the requirements of 35 U.S.C. § 112, second paragraph.

Accordingly, Applicant respectfully requests that the rejections under 35 U.S.C. § 112, second paragraph be withdrawn.

Applicant's Response to Examiner's Request for a Brief Statement

At page 5, section 12 of the Office Action, the Examiner has made a special request for a "brief statement of how the applicant's art is separate and distinct from the prior art provided by applicant." It appears that the Examiner is referring to documents cited by Applicant in an Information Disclosure Statement ("IDS") on September 24, 2004 in this application. Accordingly, in response to the Examiner's special request, Applicant hereby provides a brief statement as to how that the present invention is separate and distinct from the prior art submitted in the IDS on September 24, 2004 in this application.

Applicant respectfully submits that the subject matter of claims 1, 6 and 7 are new and involve an inventive step in view of the prior art documents submitted in the IDS in this application on September 24, 2004, listed as follows:

Document 1: JP-2002-25765-A (Kyushu Matsushita Electric Co., Ltd.), 25 January 2002,

Document 2: JP-2000-68050-A (Casio Computer Co., Ltd.), 3 March 2000,

Document 3: JP-4-137483-A (Toshiba Co., Ltd.), 12 May 1992,

Document 4: JP-7-211455-A (Idemitsu Kosan Co., Ltd.), 11 August 1995,

Document 5: JP-9-161967-A (Motorola, Inc.), 20 June 1997,

Document 6: JP-10-247587-A (TDK Corp.), 14 September 1998, and

Document 7: JP-2002-117973-A (TOYOTA CENTRAL RES & DEV LAB INC), 19 April 2002.

Applicant respectfully submits that Document 1, JP-2002-25765-A discloses an organic electroluminescent (EL) element of high reliability, having a protection part formed in the upper part of the EL element to allow film formation until a thickness for suppressing the dark spot grows perfectly and so dense as to prevent infiltration of moisture, oxygen, etc., from the outside. As shown in Fig. 1, the protection part 9 of the organic EL element is provided over the element and embodied in a laminate structure 7, 8 consisting of two or more substances including silicon nitride oxide. This constitution allows the protection part with a large film thickness to be formed readily, without destroying the element par with the stress and can completely preclude infiltration of moisture, oxygen, etc., from the outside.

Applicant respectfully submits that Document 1 describes the constitution wherein a polymer compound film 7 and an inorganic barrier film 8 covering the polymer compound film 7 are used as a sealing layer 9 of an organic EL display panel, and specifically, Document 1's claim 3 shows a technology of forming "silicon nitride oxide" as the inorganic barrier film 8. Document 1's para. [0043] shows a technology of using polyparaxylylene or the like as the polymer compound, and furthermore Document 1's para. [0028] shows a technology of using PET, PC, etc. for a flexible substrate.

However, Applicant respectfully submits that there is no description concerning any features that "the edge of the polymer compound film 7 is so formed that said edge becomes gradually thinner" and "the anode 6 and cathode 2 (first and second display electrodes) have ends uncovered with the inorganic barrier film 8" in Document 1.

Applicant respectfully submits that Document 2, JP-2000-68050-A discloses an EL element which suppresses generation and growth of dark spots and has long service life for

luminescence. The EL element has, as shown in Fig. 8, anodes 2, a positive hole transporting layer 4, an electron transport layer 5 and a cathode 6 on the back side which are formed on a transparent substrate 1, to form an EL part. The whole EL part is covered with an organic protective film 7 and an inorganic protective film 8. A back substrate 9 is laminated opposite to the transparent substrate 1 via a sealing member 10 made of a UV setting resin, then the sealing member 10 is cured. Thereafter, a UV adhesive 11 is injected into a gap between both the substrates 9, 1 and is cured. The EL element 12 formed in this manner can prevent infiltration of air by the organic protective film 7 and the inorganic protective film 8. In addition, the use of the sealing member 10 and the UV adhesive 11 made of the photosetting resin can suppress the generation of gas from them at curing, which also efficiently suppresses the deterioration of the electron transporting layer 5 and the cathode 6, further suppresses generation and growth of dark spots.

Applicant respectfully submits that Document 2's para. [0018] states that, as shown in Fig. 5, the organic protective film 7 which becomes by paraxylene resin is formed so that the electron transport layer 5 containing the cathode 6 and the whole electron hole transporting bed 4 may be covered.

However, Applicant respectfully submits that there is no description concerning any features that "the edge of the organic protective film 7 is so formed that said edge becomes gradually thinner" and "the anode 2 and cathode 6 (first and second display electrodes) have ends uncovered with the inorganic barrier film 8" in Document 2. There is no description concerning any paraxylylene polymerized film and chlorinated paraxylylene polymerized film in Document 2. Paraxylene is not paraxylylene.

Applicant respectfully submits that Document 3, JP-4-137483-A discloses an organic film EL element with a long service life by equipping organic fluorescent thin film layer and an auxiliary layer laminated between electrodes and forming a sealing layer to protect them from the outside with vapor phase polymerized polyparaxylylene or its derivative. The organic film EL element has, as shown in Fig. 1, a glass substrate or high polymer film, etc. as a transparent base 1, in which indium oxide-tin oxide ITO is normally used for a transparent electrode 2 used as an anode. An auxiliary layer 3 is preferably made of a thin film with electron-hole conductivity and to have transparency. An organic fluorescent thin film made of aluminum trisoxine etc., is provided on it. Vaporphase polymerized polyparaxylylene or its derivative is used as a sealing layer 6 to seal them. The sealing layer made of polyparaxylylene or its derivative can be thus formed successively without exposing the atmosphere, a pair of electrodes constituting of an anode 2 and cathode 5 at least one of them is transparent and an organic thin film EL element of the organic fluorescent thin film 4 and the auxiliary layer 3 laminated between the anode 2 and the organic fluorescent thin film 4.

Applicant respectfully submits that Document 3 suggests that the single sealing layer 6 is made of a vapor phase polymerized polyparaxylylene or its derivative.

However, Applicant respectfully submits that Document 3 fails to show any inorganic film covering the sealing layer 6, i.e., there is no description concerning any layered combination of the sealing layer and the inorganic film. Furthermore there is no description concerning any features that "the edge of the sealing layer 6 is so formed that said edge becomes gradually thinner" and "the cathode 5 (second display electrode) has ends uncovered with the sealing layer 6" in Document 3.

Applicant respectfully submits that Document 4, JP-7-211455-A discloses an organic EL device having an organic EL element and a protective layer provided outside the organic EL element, the organic EL element comprising a first electrode, an organic solid layer containing an organic luminous material, and a second electrode, which are laminated sequentially over a substrate. The protective layer is made of a water absorbing material with a water absorption rate of 1% or higher and a moisture-proofing material with a water absorption rate of 0.1% or less and is formed by vapor phase film forming method. Document 4's para. [0024] describes that the protective layer is formed to cover the organic EL element. Concretely a lamination of the first electrode, the organic solid-state layer containing an organic luminous material, and the second electrode on the substrate is covered with the protective layer. When electrical conductivity matter, such as a metal, is used as dampproof matter for the protective layer, it is necessary to prepare an electric insulation layer which consists of electric insulation inorganic substances, such as electric insulation macromolecules, such as polyethylene, polystyrene, polypropylene, and poly paraxylene, and an aluminum oxide, a magnesium oxide, a germanium dioxide, boron nitride, aluminum nitride, etc. between a protective layer and an organic EL device.

However, Applicant respectfully submits that Document 4 fails to show any inorganic film covering the protective layer. Further there is no description concerning any features that "the edge of the protective layer is so formed that said edge becomes gradually thinner" and "the first and second electrodes (first and second display electrodes) have ends uncovered with the protective layer" in Document 4. Furthermore there is no description concerning any paraxylylene polymerized film and chlorinated paraxylylene polymerized film in Document 4.

Applicant respectfully submits that Document 5, JP-9-161967-A discloses a modified method for overcoating a plastic substrate to prevent the transmission of oxygen and moisture. The method for passivating an organic device arranged on a carrying transparent plastic substrate 11 is provided, and in includes, as shown in Fig. 1, a stage for overcoating the plastic substrate 11 with a multi-layer over-coating 16 constituted of transparent polymer film 17 and transparent dielectric material layers 18 in turn, a stage for forming the organic device 12 on the over-coated transparent plastic substrate 11, and a stage for sealing the organic device 12 formed on the overcoated plastic substrate 11. The polymer film layer 17 used to overcoat the plastic substrate 11 functions as a means to improve the barrier characteristic of the multi-layer over-coating 16, and the dielectric material layer 18 serves as a physical barrier against the atmospheric element which might corrode the organic device 12 and impairs the reliability of an organic LED.

Referring to the Document 5's paras. [0020] to [0023] and Figs. 4 and 5, Applicant respectfully submits that the array 12 is overcoated with a hermetic sealing system 22, comprised of a plurality of layers, includes a first buffer layer 24 of organic material which generally serves to protect array 12. Buffer layer 24 may be either an organic polymer or an organometallic complex such as parylenes and the like, or tris(8-quinolinolato) aluminum or the like. Buffer layer 24 is covered or coated with a thermal coefficient matching layer 26. The thermal coefficient matching layer 26 is overcoated by depositing a low permeability inorganic layer 28. Silicon dioxide (SiO_2) is utilized as thermal coefficient matching layer 26 and silicon nitride (Si_3N_4) is utilized as inorganic layer 28. A low work function metal, such as lithium (Li) or magnesium (Mg), is utilized as thermal coefficient matching layer 26. A stable metal, such as aluminum (Al) or indium (In) is utilized as inorganic layer 28 in conjunction with a dielectric

media positioned so as to isolate inorganic layer 28, composed of stable metal, thereby preventing shorting of array 12.

Referring to the Document 5's paras. [0025] to [0027] and Figs. 8 and 9, Applicant respectfully submits that the multi-layer overcoating 16 is deposited on the uppermost surface of substrate 11 (as previously described). The individual pixels which make up array 12 are first capped or overcoated with a layer of stable metal 54 such as indium (In) or the like. The metal 54 capping the array 12 is overcoated in generally the same layering technique as described above. A first buffering system 56 is deposited on array 12, followed by a thermal coefficient matching layer 58. Next, thermal coefficient matching layer 58 is overcoated by depositing a low permeability inorganic layer 60 over thermal coefficient matching layer 58. Array 12 is finally sealed with a layer of epoxy encapsulant 42.

Applicant respectfully submits that evidently Document 5's organic device is different form the present invention, because there is no description concerning any paraxylylene polymerized film and chlorinated paraxylylene polymerized film in Document 5.

Applicant respectfully submits that even if the over-coating layer 16 deposited on an upper surface of the plastic substrate 11 in Document 5 includes an inorganic barrier film as being similar to that on the side of the substrate in claim 7 of the present application, there is no description concerning any features that "the edge of the buffer layer 24 is so formed that said edge becomes gradually thinner" and "the cathode 15 (second display electrodes) has ends uncovered with the buffer layer 24" in Document 5.

Applicant respectfully submits that Document 6, JP-10-247587-A discloses an organic EL display which has an anode, an organic functional layer containing a luminescent layer, and a

cathode on its board surface. The organic EL display has, as shown in Fig. 3, a protection layer 7 which consists of a conductive inorganic material layer 71 in which an organic protection layer 72 is placed on a cathode 6. The organic protection layer 72 is formed using carbon fluoride polymer which contains chloride by a vacuum deposition method or a spatter method. The conductive inorganic material layer 71 is made of conductive inorganic material such as Al or TiN. By forming the conductive inorganic material layer 71 in a method which provides well step-coating property than the method used for forming an organic functional layer 5, the conductive inorganic material layer 71 contacts with at least part of a terminal electrode 3, and the cathode 6 is connected with the terminal electrode 3 electrically.

In the Document 6's paras. [0078] to [0080] and Figs. 2 (d) to (f) and 3 (d) to (f), Applicant respectfully submits that after forming the organic functional layer 5, the cathode 6 is formed without not exchanging the mask 8, then the conductive inorganic material layer 71 is successively formed without not exchanging the mask 8. The organic protective layer 72 is also formed in the condition of not removing the mask 8. This structure merely implies that the connection between cathode 6 and the terminal electrode 3 is made with the conductive inorganic material layer 71. Evidently the edge parts of the conductive inorganic material layer 71 and the surface of the substrate around those edges cannot be covered with the organic protective layer 72. See the mask 8 is used for the patterns of the cathode 6, the conductive inorganic material layer 71 and the organic protective layer 72 as shown in Figs. 3 (d) to (f). Further, Document 6 cannot teach any formation of the polymer compound film between the cathode 6 and the conductive inorganic material layer 71. Otherwise the polymer compound film will prevent form electrical connection between the cathode 6 and the conductive inorganic material layer 71.

Applicant respectfully submits that although Document 6's para. [0084] suggests that the edge of the conductive inorganic material layer 71 in an organic EL display panel is formed in a tapered shape as shown in Fig. 5 (a), it should be noted that Document 6 merely discloses the conductive inorganic material layer 71 with an inclination of peripheral edge but not any polymer compound film having a slope edge for a smooth inorganic surface of an inorganic barrier film to be formed thereon.

Furthermore, Applicant respectfully submits that there is no description concerning any paraxylylene polymerized film and chlorinated paraxylylene polymerized film in Document 6.

Applicant respectfully submits that Document 7, JP-2002-117973-A discloses an organic EL element with an excellent protective film having a high cooling effect of the element and a high shielding property of moisture and oxygen in the air at a low cost. The organic EL element is provided, as shown in Fig. 1, with at least an organic compound layer 30 between a first electrode 12 and a second electrode 16 to form an element region, and a protective film 20 including a polymerized film of a hetero-cyclic compound is formed to cover the element region. Applicant respectfully submits that the hetero-cyclic compound of the protective film is a five-membered ring compound such as furan, pyrrole, and thiophene, and the polymerized film includes a polymer of one of the compounds or a copolymer of two or more compounds. The polymerized film of the hetero-cyclic compound can be formed as a thin film by plasma polimerization, it exerts a sufficient shielding property against water and oxygen or the like, it has relatively high thermal conductivity, and it can be manufactured at a low cost. A layered structure including the polymerized film and inorganic protective films such as a silicon nitride

film, a silicon oxide film, and a DLC film in this order or in the inverse order may be used for the protective film 20.

However, Applicant respectfully submits that there is no description concerning any paraxylylene polymerized film and chlorinated paraxylylene polymerized film in Document 7.

In summary, Applicant respectfully submits that all of the above-discussed cited documents do not include any disclosure concerning at least the claimed features "the edge of said polymer compound film is so formed that said edge becomes gradually thinner" and "the first and second display electrodes have ends uncovered with said inorganic barrier film" in newly-amended independent claim 1 of the instant application.

Therefore, Applicant respectfully submits that it would not be obvious to a person skilled in the subject art to apply Document 6's disclosure to those of the other documents. After reviewing these documents in detail, Applicant has no doubt that the inventions described in the current form of claims 1, 6 and 7 of the instant application are patentable even in light of the disclosures of Documents 1-7.

CONCLUSION

In view of the foregoing, Applicant submits that the pending claims are in condition for allowance, and respectfully request reconsideration and timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant's undersigned representative to expedite prosecution. A favorable action is awaited.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

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Dated: October 10, 2007 By: 

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